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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR   | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|------------------------|---------------------|------------------|
| 10/718,383      | 11/19/2003  | Thomas Joel Massingill |                     | 9726             |

7590 06/30/2006  
Thomas J. Massingill  
170 Northridge Drive  
Scotts Valley, CA 95066

EXAMINER

WILLIAMS, ALEXANDER O

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2826

DATE MAILED: 06/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/718,383

Applicant(s)

MASSINGILL, THOMAS JOEL

Examiner

Alexander O. Williams

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01 April 1306.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 19-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 19-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 2/6/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

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Serial Number: 10/718383

Filing Date: 11/19/2003;

Applicant: Massingill

Examiner: Alexander Williams

This application claims the benefit of a provisional patent application # 60/460347, filed 4/4/2003.

Applicant's Amendment filed 4/13/06 has been acknowledged.

Applicant's election of species of figure 3 (claims 1 and 4 to 18), filed 9/26/05, has been acknowledged.

This application contains claims 2 and 3 drawn to an invention non-elected without traverse.

Claims 1 and 4-18 have been cancelled. New claims 19-31 have been added.

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the claim language of claim 19-31 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure

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is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to because in figure 4, "100b" is defined as a via, however is not directed to a via. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are

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not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Note: Withdrawn claims 2 and 3 now depend on cancelled claim 1.

Note: claim 20 ends with two periods.

Note: Claim 19 ends with no period.

Claims 19 to 31 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 19, it is unclear and confusing to understand what is meant by “a semiconductor package comprising an integrated circuit die with a plurality of die bond pads, a printed circuit board, with a plurality of package bond pads, with a plurality of package pads, with electrical circuitry of a plurality of voltages, connecting the selective package bond pads to respective selected package pads, with a plurality of conductive traces, or conductive planes, a recess in the printed wiring board, to attach the die, to contain the plurality of die bond pads and plurality of package bond pads, where the electrical circuitry is available across the total area of the recess, including under the die, wherein there are a plurality of metallic vias in the printed wiring board and under the die, to conduct heat away from the die. With the recess formed by bending or deforming the printed circuit board, a plurality of electrical connections between the plurality of die bond pads and the plurality of package bond pads” because the punctuation errors and no punctuation problems in the claimed form.

In claim 19, it is unclear and confusing to what is meant by “a printed circuit board, with a **plurality of package bond pads**, with a **plurality of package pads** with electrical circuitry of a plurality of voltages, connecting the selective package bond pads

to respective selected package pads, with a plurality of conductive traces, or conductive planes.” The specification define “57” as the “package bond pad.” What defines the plurality of package pads? Where are they should in the drawing and defined in the specification? It appears they are connecting 55 but please define.

In claim 25, it is unclear and confusing to what is meant by and what shows “wherein the metal core is made from a material with a TCE to match the integrated circuit die.” How is this possible? Please explain so the Examiner can determine what is being claimed.

In claim 27, it is unclear and confusing to what is meant by “wherein the metal core is made from a material with a TCE half way between the integrated circuit die and the electronic board on which the semiconductor package is mounted. How is this possible? Please explain so the Examiner can determine what is being claimed.

In claim 27, the phrase “electronic board” lacks proper antecedent basis. Only a printed circuit board is previously defined in the specification and claims. Is this the same as the printed circuit board or is this another board? Please explain so the Examiner can determine what is being claimed.

In claim 29, it is unclear and confusing to what is meant by “wherein there are a plurality of solder balls attached to respective selected package pads.” Where are the “selected package pads” defined in the drawings and specification?

Any of claims 19-31 not specifically addressed above are rejected as being dependent on one or more of the claims which have been specifically objected to above.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Initially, and with respect to claims 19, 30 and 31, note that a "product by process" claim is directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); In re Fitzgerald, 205 USPQ 594, 596 (CCPA); In re Marosi et al., 218 USPQ 289 (CAFC); and most recently, In re Thorpe et al., 227 USPQ 964 (CAFC, 1985) all of which make it clear that it is the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that, as here, an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that Applicant has burden of proof in such cases as the above case law makes clear.

Claims 19-31, **insofar as they can be understood**, are rejected under 35 U.S.C. § 103(a) as being unpatentable over Terui (U.S. Patent # 6,472,732 B1).

19. For example, Terui (figures 1 to 19) specifically figures 14A-17 show a semiconductor package comprising an integrated circuit die **56,86** with a plurality of die bond pads (inherent), a printed circuit board **40,70**, with a plurality of package bond pads (**inherent**), with a plurality of package pads **43,73**, with electrical circuitry of a plurality of voltages, connecting the selective package bond pads to respective selected package pads, with a plurality of conductive traces **46,76**, or conductive planes, a recess (**portion of 40,70 above 53,83**) in the printed wiring board, to attach the die, to contain the plurality of die bond pads and plurality of package bond pads, where the electrical circuitry is available across the total area of the recess, including under the die, wherein there are a plurality of metallic vias (inherent) in the printed wiring board and under the die, to conduct heat away from the die, with the recess formed by

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bending or deforming the printed circuit board, a plurality of electrical connections **55,85** between the plurality of die bond pads and the plurality of package bond pads.

As to the grounds of rejection under section 103, see MPEP § 2113.

Claims 19-31, **insofar as they can be understood**, are rejected under 35 U.S.C. § 103(a) as being unpatentable over Aoyagi (U.S. Patent Application Publication # 2004/0094831 A1).

19. For example, Aoyagi (figures 1 to 19) specifically figure 2 show a semiconductor package comprising an integrated circuit die **50** with a plurality of die bond pads (inherent), a printed circuit board **40**, with a plurality of package bond pads (**inherent**), with a plurality of package pads (**inherent**), with electrical circuitry of a plurality of voltages, connecting the selective package bond pads to respective selected package pads, with a plurality of conductive traces **42**, or conductive planes, a recess (**portion of 40 where 50 sits**) in the printed wiring board, to attach the die, to contain the plurality of die bond pads and plurality of package bond pads, where the electrical circuitry is available across the total area of the recess, including under the die, wherein there are a plurality of metallic vias (inherent) in the printed wiring board and under the die, to conduct heat away from the die, with the recess formed by bending or deforming the printed circuit board, a plurality of electrical connections **51** between the plurality of die bond pads and the plurality of package bond pads.

As to the grounds of rejection under section 103, see MPEP § 2113.

Claims 19-31, **insofar as they can be understood**, are rejected under 35 U.S.C. § 103(a) as being unpatentable over Chung (U.S. Patent # 6,376,769 B1).

19. For example, Chung (figures 1 to 32) specifically figure 20 show a semiconductor package **402** comprising an integrated circuit die **420** with a plurality of die bond pads (inherent), a printed circuit board **410**, with a plurality of package bond pads **430**, with a



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plurality of package pads **430**, with electrical circuitry of a plurality of voltages, connecting the selective package bond pads to respective selected package pads, with a plurality of conductive traces **413**, or conductive planes, a recess (**portion of 410 where 420 sits**) in the printed wiring board, to attach the die, to contain the plurality of die bond pads and plurality of package bond pads, where the electrical circuitry is available across the total area of the recess, including under the die, wherein there are a plurality of metallic vias (inherent) in the printed wiring board and under the die, to conduct heat away from the die, with the recess formed by bending or deforming the printed circuit board, a plurality of electrical connections **424** between the plurality of die bond pads and the plurality of package bond pads.

As to the grounds of rejection under section 103, see MPEP § 2113.

## Response

Applicant's arguments filed 4/13/06 have been fully considered, but are moot in view of the new grounds of rejections detailed above.

The insertion of Applicant's additional claimed language, for example, "new claims 19-31" cause for further search and consideration to make this action final.

Applicant's amendment necessitated the new grounds of rejection. Accordingly, **THIS ACTION IS MADE FINAL**. See M.P.E.P. § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 C.F.R. § 1.136(a).

A SHORTENED STATUTORY PERIOD FOR RESPONSE TO THIS FINAL ACTION IS SET TO EXPIRE THREE MONTHS FROM THE DATE OF THIS ACTION. IN THE EVENT A FIRST RESPONSE IS FILED WITHIN TWO MONTHS OF THE MAILING DATE OF THIS FINAL ACTION AND THE ADVISORY ACTION IS NOT MAILED UNTIL AFTER THE END OF THE THREE-MONTH SHORTENED STATUTORY PERIOD, THEN THE SHORTENED STATUTORY PERIOD WILL EXPIRE ON THE DATE THE ADVISORY ACTION IS MAILED, AND ANY EXTENSION

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FEE PURSUANT TO 37 C.F.R. § 1.136(a) WILL BE CALCULATED FROM THE MAILING DATE OF THE ADVISORY ACTION. IN NO EVENT WILL THE STATUTORY PERIOD FOR RESPONSE EXPIRE LATER THAN SIX MONTHS FROM THE DATE OF THIS FINAL ACTION.

The listed references are cited as of interest to this application, but not applied at this time.

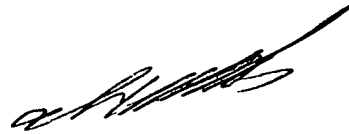
| Field of Search  | Date                |
|--|---------------------|
| U.S. Class and subclass:<br>257/668,734,737,738,691,690,602,693,697,698,666,783,707,712,713,717,720,706,703,702,699,786,784,676,675,e25.013,e23.172,e23.065,e23.125,e23.177,e23.179,e23.069,e23.064,e23.07,e23.19,e25.013                          | 10/15/05<br>6/23/06 |
| Other Documentation:<br>foreign patents and literature in<br>257/668,734,737,738,691,690,602,693,697,698,666,783,707,712,713,717,720,706,703,702,699,676,675,e25.013,e23.172,e23.065,e23.125,e23.177,e23.179,e23.069,e23.064,e23.07,e23.19,e25.013 | 10/15/05<br>6/23/06 |
| Electronic data base(s):<br>U.S. Patents EAST  | 10/15/05<br>6/23/06 |

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander O. Williams whose telephone number is (571) 272 1924. The examiner can normally be reached on M-F 6:30AM-7:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (571) 272 1915. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Alexander O Williams  
Primary Examiner  
Art Unit 2826

AOW  
6/24/06